December 5, 2011

Mr. Tom Gainer
Oregon Department of Environmental Quality
2020 SW Fourth Avenue, Suite 400
Portland, OR 97201-4987

Subject: **Response to DEQ Comments**
Storm Water Source Control Completion Report
Port of Portland Terminal 4 Slips 1 and 3

Dear Tom:

This letter provides the Oregon Department of Environmental Quality (DEQ) with a response to the comments received on the Terminal 4 Slips 1 and 3 *Storm Water Source Control Completion Report* (Ash Creek, 2011). The comments were provided to the Port of Portland (Port) in a letter from the DEQ dated November 4, 2011. The DEQ comments are repeated (in italics) followed by the Port response.

Section 2.3.2: *Stormwater treatment systems in Basins D and M appear to have bypass piping. Please describe when bypass occurs, what portion of flow bypasses treatment, and the frequency and duration of bypass events.*

Response. The response for each basin storm water treatment system is evaluated below.

Basin M. As described in the *Storm Water Source Control Evaluation* (SW SCE), a diversion wall is installed in the conveyance line south of the Stormfilter® vault to direct flow into the treatment system. Based on a review of the Stormfilter® system construction and flow capacity, it appears that the system is capable of treating up to 0.37 cubic feet per second (CFS). This suggests that the storm water first flush is treated. Higher flows are directed through the bypass. While the portion of the flow that bypasses treatment has not been determined, the first flush of each storm event is treated thereby removing the highest expected TSS concentrations.

Basin D. Concentrations of constituents in storm water and storm water solids collected from Basin D were evaluated during the 2007/2008 sampling program. As noted in the SW SCE, Basin D storm water and storm water solids samples rarely exceeded the Joint Source Control Strategy (JSCS) screening level values (SLVs) (Ash Creek, 2009). When exceedances were noted, the exceedance was associated with extremely low SLV values or, with the exception of a few analytes in the storm water solids sample, the concentrations were just slightly above the SLV. Additionally, concentrations of TSS were ranged from 6 to 19 mg/L, which were the lowest TSS values observed across Terminal 4. The system is inspected monthly and is cleaned out as necessary.

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Based on a review of the Downstream Defender® system construction and flow capacity, it appears that the system is capable of treating up to 2.5 cubic feet per second (CFS). This suggests that the storm water first flush is treated. Higher flows are directed through the bypass. While the portion of the flow that bypasses treatment has not been determined, the first flush of each storm event is treated thereby removing the highest expected TSS concentrations. Based upon the low TSS and constituent concentrations observed, and the current basin use, the Downstream Defender® is adequately controlling storm water sources to the river from this basin and no further source control measures were recommended in the SW SCE Report and approved by DEQ.

Section 2.4.1: *This and subsequent stormwater sampling results should be incorporated into the final sediment recontamination evaluation.*

Response. Noted. As indicated in the response to DEQ comments (dated January 29, 2010) on the SW SCE the storm water sampling results will be evaluated as part of the recontamination evaluation.

Sections 6.1 and 7.3, Figure F-1: *It appears that stormwater arsenic concentrations increased in Basins L and M after the pipeline cleanout SCMs, and post-SCM concentrations are elevated in Basins L and M relative to other Portland Harbor sites. This indicates that for arsenic: 1) legacy pipeline sediment may not have been the primary contaminant source in stormwater, 2) upland sources may remain, and 3) further efforts are required to reduce stormwater concentrations to the lower, flat portion of the curve, supported by continued stormwater monitoring to evaluate the effectiveness.*

Response. The data collected during Terminal 4 Slip 1 Remedial Investigation (T4S1 RI) (Ash Creek/Newfields, 2007) did not identify sources of arsenic in surface soil in Basin L or M.

Five of the seven arsenic concentrations detected in samples collected from Basin L are on the lower, flat portion of curve for Portland Harbor Heavy Industrial (HI) Sites (ranging from less than 0.5 ug/L to 1.61 ug/L), including concentrations detected in the most recent February 12, 2011 storm water sample (0.95 ug/L). As there is no known mechanism for arsenic concentrations to increase following the Source Control Measures (SCMs), concentrations detected during the October 23 and November 6, 2010 events are likely due to the inherent variability in storm water and not representative of arsenic concentrations consistently discharged from Basin L.

Similarly, while the concentrations detected in samples collected from Basin M during the October 23 and November 6, 2010 storm water sampling events were elevated, the concentration of arsenic detected in the February 12, 2011 sample collected from Basin M is consistent with the pre-SCM detected concentrations. The increase in the arsenic concentration detected during the other post-SCM sampling events are likely due to the inherent variability of storm water. Additionally, although the pre-SCM concentrations (2.32 to 3.67 ug/L) and the February 12, 2011 arsenic concentration (3.3 ug/L) post-SCM event were slightly elevated relative to the curve, a review of the T4S1 RI data does not suggest a correlation between the elevated concentrations and upland soil concentrations.

As noted above, the storm water sampling results will be evaluated as part of the recontamination evaluation to determine whether storm water discharges at Terminal 4 could pose a recontamination risk. Pending the results of the recontamination analysis, no further characterization or SCMs for arsenic in storm water are recommended.

Sections 6.4 and 7.3, Figure F-12: *It appears that stormwater polycyclic aromatic hydrocarbon (PAH) concentrations increased in Basin M after the pipeline cleanout SCMs, and post-SCM concentrations are elevated in Basins L and M relative to other Portland Harbor sites. This indicates that for PAHs: 1) legacy pipeline sediment may not have been the primary contaminant source in stormwater, 2) upland sources may remain, and 3) further efforts are required to reduce stormwater concentrations to the lower, flat portion of the curve, supported by continued stormwater monitoring to evaluate the effectiveness.*

Response. The data collected during the T4S1 RI did not identify sources of PAHs in surface soil in Basin L or M.

The average total PAH concentrations detected in samples collected during five of the seven sampled storm events collected from Basin M is 1.87 ug/L, which is on the upper end of the flat portion of the curve. The total PAH concentrations detected during the first pre-SCM event (6.45 ug/L) and last post-SCM event (6.33 ug/L) are elevated relative to the other sampling events. Similar to the isolated events with elevated arsenic concentrations, these two elevated PAH results are likely due to the inherent variable nature of storm water. The JSCS SLVs were summed (total = 2.13 ug/L) in order to calculate a general enrichment ratio (ER; average concentration divided by sum of SLVs). The ER for PAHs in Basin M was 1.7.

The average total PAH concentrations detected in samples collected from Basin L decreased significantly from 23.5 ug/L pre-SCM to 3.1 ug/L post-SCM, supporting that legacy sediment was the primary source of PAHs to storm water. Although the average concentration of total PAHs post-SCM are elevated on the curve, data collected during RI did not identify sources of PAHs in surface soil. In addition, the ER for PAHs in Basin L was 1.5.

As noted above the storm water sampling results will be evaluated as part of the recontamination evaluation to determine whether storm water discharges at Terminal 4 could pose a recontamination risk. Pending the results of the recontamination analysis, no further characterization or SCMs for PAHs in storm water are recommended.

Sections 7.1 and 7.3: *As described above for Basins L and M, it is not clear that "surface soil is not a stormwater source" and stormwater is in the range of other Portland Harbor sites for arsenic and PAHs. Additional best management practices should be implemented in Basins Land M to reduce stormwater concentrations to the lower, flat portion of the Portland Harbor stormwater curves, supported by continued stormwater monitoring to evaluate the effectiveness (including first flush sampling). Potential BMPs include installing catch basin filter fabric inserts, increasing sweeping frequency, and improving Stormfilter performance in Basin M and/or increasing treatment capacity.*

Response. As described in the T4S1 RI and results discussed above, surface soil concentrations at Terminal 4 do not correlate to the PAH concentrations detected in storm water. The elevated average concentrations of arsenic and PAHs in Basins L and M are

largely due to elevated results in one or two sampling events. This can be expected due to the variable nature of storm water sampling. As demonstrated in the *Storm Water Source Control Completion Report*, the line cleanouts resulted in significantly reduced concentrations of many constituents in storm water, indicating that legacy sediments were the primary source.

As noted above the storm water sampling results will be evaluated as part of the recontamination evaluation to determine whether storm water discharges at Terminal 4 could pose a recontamination risk. Pending the results of the recontamination analysis, no further characterization, SCMs, or BMPs are recommended.

Please call me at (503) 415-6676 if you have any questions.

Sincerely,

Kelly Madalinski
Environmental Project Manager

References:

Ash Creek/Newfields, 2007. *Remedial Investigation Report, Terminal 4 Slip 1 Upland Facility.* August 2007.

Ash Creek, 2009. *Storm Water Source Control Evaluation Report,* Terminal 4 Slip 1 and Slip 3 Upland Facilities. September 2009.

Ash Creek, 2011. *Storm Water Source Control Completion Report*, Terminal 4 Slip 1 and Slip 3 Upland Facilities. September 2011.

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